COURSE DESCRIPTION CARD - SYLLABUS

Course name
Human reliability [S1IBiJ1>NC]

Course

Field of study
Safety and Quality Engineering

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
15

Laboratory classes
0

Other
0

Tutorials
15

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

Prerequisites

The student should have basic knowledge in the field of occupational health and safety, ergonomics and psychology. The student should know the general principles of operation of technical facilities and modern management concepts. He can recognize cause-and-effect relationships occurring in the area of broadly understood safety. The student should be able to assess the degree of compliance of the workplace organization with the applicable requirements in the field of ergonomics, occupational health and safety and environmental protection regulations.

Course objective

Provide students with knowledge of theoretical premises and practical solutions that, when applied, will contribute to the rational shaping of optimal working conditions. Motivating to acquire knowledge and skills in the field of improving work organization, preventing occupational diseases and accidents at work. To lay the foundations for the development of the ability to apply the concept of distributed cognition in the design and application of technologies related to the work process.

Course-related learning outcomes

Knowledge:

1. The student has advanced knowledge of technical safety systems, including occupational health and safety rules, and understands how these systems prevent threats and minimize their effects [K1_W02].
2. The student has advanced knowledge of issues related to the identification, analysis and assessment of risk in the context of people in the work environment [K1_W03].
3. The student knows the fundamental dilemmas of modern civilization and development trends as well as best practices in the field of human reliability testing [K1_W10].

Skills:
1. The student is able to use various techniques to communicate in a professional environment and identify human reliability [K1_U02].
2. The student is able to take part in a debate and present, using appropriately selected means, a problem that falls within the framework of human reliability research [K1_U09].
3. The student is able to identify changes in requirements, standards, regulations, technical progress and the reality of the labor market, and on their basis determine the need to supplement knowledge [K1_U12].

Social competences:
1. Student and awareness of recognizing the importance of knowledge in solving problems in the field of safety and quality engineering and continuous improvement [K1_K02].
2. The student is aware of understanding non-technical aspects and effects of engineering activities, including its impact on the environment and the related responsibility for decisions made [K1_K03].
3. The student is able to initiate activities related to the formulation and transfer of information and cooperation in society in the area of safety engineering [K1_K05].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formative assessment:
- lecture: evaluation of activity and presentation of the effects of a problem lecture, presentation of premises in relation to the problem in question,
- exercises: evaluation of reports from performed exercises and evaluation of tasks to be performed by oneself.

Summative assessment:
- exercises: average of the marks for the prepared reports,
- lecture: written test in which at least one answer is correct (the answer is scored in the range of 0 to 10) or answers to open questions (answers are scored on a scale from 0 to 100); a student receives a credit after reaching at least 51% of the possible points.

Programme content

The program covers theoretical foundations on: Reliability in a systems perspective; Fundamentals of reliability modeling; Measures of system readiness; Anthropocentric approach in improving the safety of work systems.

Course topics

The lecture program covers the following topics:
Basic concepts and measures used in the area of security issues;
Reliability in a systems perspective;
Fundamentals of reliability modeling;
Reliability structure of an object;
System analysis;
Human psychological capabilities as a basis for predicting errors;
Creating measures of human reliability. The role of humans in ensuring the reliability of technical and social systems;
Measures of system readiness;
The essence of information environment design;
Improvement of the operator's work system, Active operator strategy.

Students perform exercises on the following topics:

Relationships of risk measures with reliability and hazard measures;
Modeling of phenomena leading to malfunction;
Characteristics of difficult situations. Application of knowledge of human reliability in practice;
Determinants of the correct course of information processes;
Application of the theoretical approach of cognitive psychology. Application of elements of ergonomics cognitive ergonomics in the design of human interaction with the industrial process;
Implementation of systemic adaptive mechanisms.

Teaching methods

- lecture: problem lecture with elements of gathering premises and the stage of solving the problem,
- exercises: the round table method interchangeably with the panel method.

Bibliography

Basic:
1. Sławińska M., (2012), Niezawodność człowieka w interakcji z procesem przemysłowym, Wydawnictwo Politechniki Poznańskiej, Poznań.
2. Sadłowska-Wrzesińska J., Lewicki L., (2018), Podstawy bezpieczeństwa i zdrowia w pracy, Wydawnictwo WSL, Poznań.
3. Dahlke G. (2013), Zarządzanie bezpieczeństwem pracy i higieną pracy, Wydawnictwo Politechniki Poznańskiej, Poznań.
4. Tadeusz Szopa, (2016), Niezawodność i bezpieczeństwo, Oficyna Wydawnicza Politechniki Poznańskiej, Warszawa.
5. Sikorski M., (2010), Interakcja człowiek-komputer, Wydawnictwo PJWSTK, Warszawa.
6. Górska E., (2021). Ergonomia, projektowanie, diagnoza, eksperymenty. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa.
7. PN-ISO 45001:2018-06, Systemy zarządzania bezpieczeństwem i higieną pracy. Wymagania i wytyczne stosowania, PKN, Warszawa.

Additional:
1. Górny A., Sławińska M., Sobczak W. (2016), Ocena kompetencji jako narzędzie zapewnienia bezpieczeństwa w przedsiębiorstwie budowalnym, Finanse, Rynki Finansowe, Ubezpieczenia, nr 5 (83/2), s. 109-119.
2. Kępka P. (2015), Projektowanie systemów bezpieczeństwa, BEL Studio, Warszawa, ISBN: 978-83-7798-232-7.
3. Sławińska M., Wróbel K., (2021). Indicative Method of Human Failure in Sustainable Chain of Custody Management. European Research Studies Journal Volume XXIV Special Issue 5, p. 709-725.
4. Pieniążek J., (2014). Kształtowanie współpracy człowieka z lotniczymi systemami sterowania. Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów, s. 179-236.
5. . PKN-ISO Guide 73:2012, Zarządzanie ryzykiem. Terminologia, PKN, Warszawa.
6. Tomaszewski T., Tomaszewski K., (2006). Przepisy i normy w projektowaniu ergonomicznym. [W:] Ergonomia produktu. Ergonomiczne zasady projektowania produktów, Jabłoński J., (red). Wydawnictwo Politechniki Poznańskiej, Poznań.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	0,50